

# SEQUENCE LISTING

<110> Lawn, Richard M.  
Wade, David  
Garvin, Michael  
Oram, John F.

<120> Compositions and Methods for Increasing Cholesterol  
Efflux and Raising HDL using ATP Binding Cassette  
Transporter Protein ABC1

<130> 99,395-A

<140>

<141>

<150> US 60/140,264

<151> 1999-06-18

<150> US 60/153,872

<151> 1999-08-14

<150> US 60/166,573

<151> 1999-11-19

<160> 57

<170> PatentIn Ver. 2.0

<210> 1

<211> 10442

<212> DNA

<213> Homo sapiens

<400> 1

```

ggccgggacc cgcagagccg agccgaccct tctctcccg gctgcggcag ggcagggcgg 60
ggagctccgc gcaccaacag agccggttct cagggcgctt tgctccttgt tttttccccg 120
gttctgtttt ctcccccttct ccggaaggct tgtcaagggg taggagaaag agacgcaaac 180
acaaaagtgg aaaacagtta atgaccagcc acggggtctc ctgctgtgag ctctggccgc 240
tgcttccag ggctcccag ccacacgctg ggcgtgctgg ctgaggaac atggcttgtt 300
ggctcagct gaggttgctg ctgtggaaga acctcacttt cagaagaaga caaacatgtc 360
agctgttact ggaagtggcc tggcctctat ttatcttct gatcctgac tctgttcggc 420
tgagctaccc accctatgaa caacatgaat gccattttcc aaataaagcc atgccctctg 480
caggaacact tccttgggtt caggggatta tctgtaatgc caacaacccc tgtttccgtt 540
accgactcc tggggaggct cccggagttg ttggaaactt taacaaatcc attgtggctc 600
gcctgttctc agatgctcgg aggcctcttt tatacagcca gaaagacacc agcatgaagg 660
acatgcgcaa agttctgaga acattacagc agatcaagaa atccagctca aacttgaagc 720
ttcaagattt cctggtggac aatgaaacct tctctgggtt cctatatcac aacctctctc 780

```











Tyr Thr Pro Asp Thr Pro Ala Thr Arg Gln Val Met Ala Glu Val Asn  
385 390 395 400

Lys Thr Phe Gln Glu Leu Ala Val Phe His Asp Leu Glu Gly Met Trp  
405 410 415

Glu Glu Leu Ser Pro Lys Ile Trp Thr Phe Met Glu Asn Ser Gln Glu  
420 425 430

Met Asp Leu Val Arg Met Leu Leu Asp Ser Arg Asp Asn Asp His Phe  
435 440 445

Trp Glu Gln Gln Leu Asp Gly Leu Asp Trp Thr Ala Gln Asp Ile Val  
450 455 460

Ala Phe Leu Ala Lys His Pro Glu Asp Val Gln Ser Ser Asn Gly Ser  
465 470 475 480

Val Tyr Thr Trp Arg Glu Ala Phe Asn Glu Thr Asn Gln Ala Ile Arg  
485 490 495

Thr Ile Ser Arg Phe Met Glu Cys Val Asn Leu Asn Lys Leu Glu Pro  
500 505 510

Ile Ala Thr Glu Val Trp Leu Ile Asn Lys Ser Met Glu Leu Leu Asp  
515 520 525

Glu Arg Lys Phe Trp Ala Gly Ile Val Phe Thr Gly Ile Thr Pro Gly  
530 535 540

Ser Ile Glu Leu Pro His His Val Lys Tyr Lys Ile Arg Met Asp Ile  
545 550 555 560

Asp Asn Val Glu Arg Thr Asn Lys Ile Lys Asp Gly Tyr Trp Asp Pro  
565 570 575

Gly Pro Arg Ala Asp Pro Phe Glu Asp Met Arg Tyr Val Trp Gly Gly  
580 585 590

Phe Ala Tyr Leu Gln Asp Val Val Glu Gln Ala Ile Ile Arg Val Leu  
595 600 605

Thr Gly Thr Glu Lys Lys Thr Gly Val Tyr Met Gln Gln Met Pro Tyr  
610 615 620

Pro Cys Tyr Val Asp Asp Ile Phe Leu Arg Val Met Ser Arg Ser Met  
625 630 635 640

Pro Leu Phe Met Thr Leu Ala Trp Ile Tyr Ser Val Ala Val Ile Ile  
645 650 655

Lys Gly Ile Val Tyr Glu Lys Glu Ala Arg Leu Lys Glu Thr Met Arg  
660 665 670

Ile Met Gly Leu Asp Asn Ser Ile Leu Trp Phe Ser Trp Phe Ile Ser  
675 680 685

Ser Leu Ile Pro Leu Leu Val Ser Ala Gly Leu Leu Val Val Ile Leu  
690 695 700

Lys Leu Gly Asn Leu Leu Pro Tyr Ser Asp Pro Ser Val Val Phe Val  
705 710 715 720

Phe Leu Ser Val Phe Ala Val Val Thr Ile Leu Gln Cys Phe Leu Ile  
725 730 735

Ser Thr Leu Phe Ser Arg Ala Asn Leu Ala Ala Ala Cys Gly Gly Ile  
740 745 750

Ile Tyr Phe Thr Leu Tyr Leu Pro Tyr Val Leu Cys Val Ala Trp Gln  
755 760 765

Asp Tyr Val Gly Phe Thr Leu Lys Ile Phe Ala Ser Leu Leu Ser Pro  
770 775 780

Val Ala Phe Gly Phe Gly Cys Glu Tyr Phe Ala Leu Phe Glu Glu Gln  
785 790 795 800

Gly Ile Gly Val Gln Trp Asp Asn Leu Phe Glu Ser Pro Val Glu Glu  
805 810 815

Asp Gly Phe Asn Leu Thr Thr Ser Ile Ser Met Met Leu Phe Asp Thr  
820 825 830

Phe Leu Tyr Gly Val Met Thr Trp Tyr Ile Glu Ala Val Phe Pro Gly  
835 840 845

Gln Tyr Gly Ile Pro Arg Pro Trp Tyr Phe Pro Cys Thr Lys Ser Tyr  
850 855 860

Trp Phe Gly Glu Glu Ser Asp Glu Lys Ser His Pro Gly Ser Asn Gln  
865 870 875 880

Lys Arg Met Ser Glu Ile Cys Met Glu Glu Glu Pro Thr His Leu Lys  
885 890 895



Leu Gly Val Ser Ile Gln Asn Leu Val Lys Val Tyr Arg Asp Gly Met  
 900 905 910

Lys Val Ala Val Asp Gly Leu Ala Leu Asn Phe Tyr Glu Gly Gln Ile  
 915 920 925

Thr Ser Phe Leu Gly His Asn Gly Ala Gly Lys Thr Thr Thr Met Ser  
 930 935 940

Ile Leu Thr Gly Leu Phe Pro Pro Thr Ser Gly Thr Ala Tyr Ile Leu  
 945 950 955 960

Gly Lys Asp Ile Arg Ser Glu Met Ser Thr Ile Arg Gln Asn Leu Gly  
 965 970 975

Val Cys Pro Gln His Asn Val Leu Phe Asp Met Leu Thr Val Glu Glu  
 980 985 990

His Ile Trp Phe Tyr Ala Arg Leu Lys Gly Leu Ser Glu Lys His Val  
 995 1000 1005

Lys Ala Glu Met Glu Gln Met Ala Leu Asp Val Gly Leu Pro Ser Ser  
 1010 1015 1020

Lys Leu Lys Ser Lys Thr Ser Gln Leu Ser Gly Gly Met Gln Arg Lys  
 1025 1030 1035 1040

Leu Ser Val Ala Leu Ala Phe Val Gly Gly Ser Lys Val Val Ile Leu  
 1045 1050 1055

Asp Glu Pro Thr Ala Gly Val Asp Pro Tyr Ser Arg Arg Gly Ile Trp  
 1060 1065 1070

Glu Leu Leu Leu Lys Tyr Arg Gln Gly Arg Thr Ile Ile Leu Ser Thr  
 1075 1080 1085

His His Met Asp Glu Ala Asp Val Leu Gly Asp Arg Ile Ala Ile Ile  
 1090 1095 1100

Ser His Gly Lys Leu Cys Cys Val Gly Ser Ser Leu Phe Leu Lys Asn  
 1105 1110 1115 1120

Gln Leu Gly Thr Gly Tyr Tyr Leu Thr Leu Val Lys Lys Asp Val Glu  
 1125 1130 1135

Ser Ser Leu Ser Ser Cys Arg Asn Ser Ser Ser Thr Val Ser Tyr Leu  
 1140 1145 1150

Lys Lys Glu Asp Ser Val Ser Gln Ser Ser Ser Asp Ala Gly Leu Gly  
 1155 1160 1165

Ser Asp His Glu Ser Asp Thr Leu Thr Ile Asp Val Ser Ala Ile Ser  
 1170 1175 1180

Asn Leu Ile Arg Lys His Val Ser Glu Ala Arg Leu Val Glu Asp Ile  
 1185 1190 1195 1200

Gly His Glu Leu Thr Tyr Val Leu Pro Tyr Glu Ala Ala Lys Glu Gly  
 1205 1210 1215

Ala Phe Val Glu Leu Phe His Glu Ile Asp Asp Arg Leu Ser Asp Leu  
 1220 1225 1230

Gly Ile Ser Ser Tyr Gly Ile Ser Glu Thr Thr Leu Glu Glu Ile Phe  
 1235 1240 1245

Leu Lys Val Ala Glu Glu Ser Gly Val Asp Ala Glu Thr Ser Asp Gly  
 1250 1255 1260

Thr Leu Pro Ala Arg Arg Asn Arg Arg Ala Phe Gly Asp Lys Gln Ser  
 1265 1270 1275 1280

Cys Leu Arg Pro Phe Thr Glu Asp Asp Ala Ala Asp Pro Asn Asp Ser  
 1285 1290 1295

Asp Ile Asp Pro Glu Ser Arg Glu Thr Asp Leu Leu Ser Gly Met Asp  
 1300 1305 1310

Gly Lys Gly Ser Tyr Gln Val Lys Gly Trp Lys Leu Thr Gln Gln Gln  
 1315 1320 1325

Phe Val Ala Leu Leu Trp Lys Arg Leu Leu Ile Ala Arg Arg Ser Arg  
 1330 1335 1340

Lys Gly Phe Phe Ala Gln Ile Val Leu Pro Ala Val Phe Val Cys Ile  
 1345 1350 1355 1360

Ala Leu Val Phe Ser Leu Ile Val Pro Pro Phe Gly Lys Tyr Pro Ser  
 1365 1370 1375

Leu Glu Leu Gln Pro Trp Met Tyr Asn Glu Gln Tyr Thr Phe Val Ser  
 1380 1385 1390

Asn Asp Ala Pro Glu Asp Thr Gly Thr Leu Glu Leu Leu Asn Ala Leu  
 1395 1400 1405



Met Ser Phe Val Pro Ala Ser Phe Val Val Phe Leu Ile Gln Glu Arg  
1665 1670 1675 1680

Val Ser Lys Ala Lys His Leu Gln Phe Ile Ser Gly Val Lys Pro Val  
1685 1690 1695

Ile Tyr Trp Leu Ser Asn Phe Val Trp Asp Met Cys Asn Tyr Val Val  
1700 1705 1710

Pro Ala Thr Leu Val Ile Ile Ile Phe Ile Cys Phe Gln Gln Lys Ser  
1715 1720 1725

Tyr Val Ser Ser Thr Asn Leu Pro Val Leu Ala Leu Leu Leu Leu  
1730 1735 1740

Tyr Gly Trp Ser Ile Thr Pro Leu Met Tyr Pro Ala Ser Phe Val Phe  
1745 1750 1755 1760

Lys Ile Pro Ser Thr Ala Tyr Val Val Leu Thr Ser Val Asn Leu Phe  
1765 1770 1775

Ile Gly Ile Asn Gly Ser Val Ala Thr Phe Val Leu Glu Leu Phe Thr  
1780 1785 1790

Asp Asn Lys Leu Asn Asn Ile Asn Asp Ile Leu Lys Ser Val Phe Leu  
1795 1800 1805

Ile Phe Pro His Phe Cys Leu Gly Arg Gly Leu Ile Asp Met Val Lys  
1810 1815 1820

Asn Gln Ala Met Ala Asp Ala Leu Glu Arg Phe Gly Glu Asn Arg Phe  
1825 1830 1835 1840

Val Ser Pro Leu Ser Trp Asp Leu Val Gly Arg Asn Leu Phe Ala Met  
1845 1850 1855

Ala Val Glu Gly Val Val Phe Phe Leu Ile Thr Val Leu Ile Gln Tyr  
1860 1865 1870

Arg Phe Phe Ile Arg Pro Arg Pro Val Asn Ala Lys Leu Ser Pro Leu  
1875 1880 1885

Asn Asp Glu Asp Glu Asp Val Arg Arg Glu Arg Gln Arg Ile Leu Asp  
1890 1895 1900

Gly Gly Gly Gln Asn Asp Ile Leu Glu Ile Lys Glu Leu Thr Lys Ile  
1905 1910 1915 1920

Tyr Arg Arg Lys Arg Lys Pro Ala Val Asp Arg Ile Cys Val Gly Ile  
1925 1930 1935

Pro Pro Gly Glu Cys Phe Gly Leu Leu Gly Val Asn Gly Ala Gly Lys  
1940 1945 1950

Ser Ser Thr Phe Lys Met Leu Thr Gly Asp Thr Thr Val Thr Arg Gly  
1955 1960 1965

Asp Ala Phe Leu Asn Lys Asn Ser Ile Leu Ser Asn Ile His Glu Val  
1970 1975 1980

His Gln Asn Met Gly Tyr Cys Pro Gln Phe Asp Ala Ile Thr Glu Leu  
1985 1990 1995 2000

Leu Thr Gly Arg Glu His Val Glu Phe Phe Ala Leu Leu Arg Gly Val  
2005 2010 2015

Pro Glu Lys Glu Val Gly Lys Val Gly Glu Trp Ala Ile Arg Lys Leu  
2020 2025 2030

Gly Leu Val Lys Tyr Gly Glu Lys Tyr Ala Gly Asn Tyr Ser Gly Gly  
2035 2040 2045

Asn Lys Arg Lys Leu Ser Thr Ala Met Ala Leu Ile Gly Gly Pro Pro  
2050 2055 2060

Val Val Phe Leu Asp Glu Pro Thr Thr Gly Met Asp Pro Lys Ala Arg  
2065 2070 2075 2080

Arg Phe Leu Trp Asn Cys Ala Leu Ser Val Val Lys Glu Gly Arg Ser  
2085 2090 2095

Val Val Leu Thr Ser His Ser Met Glu Glu Cys Glu Ala Leu Cys Thr  
2100 2105 2110

Arg Met Ala Ile Met Val Asn Gly Arg Phe Arg Cys Leu Gly Ser Val  
2115 2120 2125

Gln His Leu Lys Asn Arg Phe Gly Asp Gly Tyr Thr Ile Val Val Arg  
2130 2135 2140

Ile Ala Gly Ser Asn Pro Asp Leu Lys Pro Val Gln Asp Phe Phe Gly  
2145 2150 2155 2160

Leu Ala Phe Pro Gly Ser Val Leu Lys Glu Lys His Arg Asn Met Leu  
2165 2170 2175

Gln Tyr Gln Leu Pro Ser Ser Leu Ser Ser Leu Ala Arg Ile Phe Ser  
 2180 2185 2190

Ile Leu Ser Gln Ser Lys Lys Arg Leu His Ile Glu Asp Tyr Ser Val  
 2195 2200 2205

Ser Gln Thr Thr Leu Asp Gln Val Phe Val Asn Phe Ala Lys Asp Gln  
 2210 2215 2220

Ser Asp Asp Asp His Leu Lys Asp Leu Ser Leu His Lys Asn Gln Thr  
 2225 2230 2235 2240

Val Val Asp Val Ala Val Leu Thr Ser Phe Leu Gln Asp Glu Lys Val  
 2245 2250 2255

Lys Glu Ser Tyr Val  
 2260

<210> 3  
 <211> 1643  
 <212> DNA  
 <213> Homo sapiens

<400> 3  
 gaattccttg ctggtggctc cacatgcact tccagggcct gcttggctct tctatgggtc 60  
 tgtcctgagt gttgatagaa cactgatgt gagtacctgg gcttgagcgt ggctgggaga 120  
 tctgttgac tgtagcatgg agggggcttg tcagctgaat gtctgtatgc aggtggtggg 180  
 agttctggaa tatgatggag ctggagggtgg gaagagaagt aggcttgggg cagctctctc 240  
 atgccacctc attctggcca aaactcaggt caaactgtga agagtctaaa tgtgaatctg 300  
 ccttcaagg tggctacaaa ggtatctttg tcaaggtagg agacctgtg gcctccacgt 360  
 gcaattccag ggctgcttg gcctcttcta cgggtctgtc ctgagcttc tatgaatctc 420  
 ccttcagggc agattcatat ttagactctt cacagtttga cctgagtttt ggccagaata 480  
 aggtgacatt tagtttggtg gcttgatgaa tgacttaaat atttagacat atggtgtgta 540  
 ggctgcatt cctactcttg cctttttttt tgccctcca gtgttttggg tagttttgct 600  
 cccctacag ccaaaggcaa acagataagt tggagggtctg gagggtctac ataattttac 660  
 acgactgcaa ttctctggct gcaattcaca aatgtataca aactaaatac aagtcctgtg 720  
 tttttatcac agggaggctg atcaatataa tgaaattaaa agggggctgg tcccatattg 780  
 ttctgtgttt ttgtttgttt gtttcttttt ttgtttttgt ggctccttc ctctcaattt 840  
 atgaagagaa gcagtaagat gttcctctcg ggtcctctga gggacctggg gagctcaggc 900  
 tgggaatctc caaggcagta ggtcgctat caaaaatcaa agtccagggt tgtgggggga 960  
 aaacaaaagc agccattac ccagaggact gtccgccttc cctcacccc agcctaggcc 1020  
 tttgaaagga aacaaaagac aagacaaaat gattggcgtc ctgagggaga ttcagcctag 1080  
 agctctctct cccccaatcc ctccctcgg ctgaggaaac taacaaagga aaaaaaatt 1140  
 gcggaaagca ggatttagag gaagcaaatt cactggtgc ccttggctgc cggaacgtg 1200  
 gactagagag tctgcggcgc agccccgagc ccagcgcttc ccgcgcgtct taggcggcg 1260  
 ggcccgggcg ggggaagggg acgcagaccg cggaccctaa gacacctgct gtaccctcca 1320

ccccacccc acccacctcc cccactcc ctagatgtgt cgtgggcggc tgcgtcgc 1380  
 ccgtttaagg ggcgggcccc ggctccacgt gctttctgct gagtgactga actacataaa 1440  
 cagaggccgg gaacggggcg gggaggagg agagcacagg ctttgaccga tagtaacctc 1500  
 tgcgctcggg gcagccgaat ctataaaagg aactagtccc ggcaaaaacc ccgtaattgc 1560  
 gagcgagagt gaggggggcc gggaccgcga gagccgagcc gacccttctc tcccgggctg 1620  
 cggcagggca gggcggggag ctc 1643

<210> 4

<211> 748

<212> DNA

<213> Homo sapiens

<400> 4

attccaanaa cattttccng catctgtggt tgccaactca caatgtcttt cattttctga 60  
 acttaccnc caaatgaagn tcggcacgca attatgtagt agcnactctt agggcccccg 120  
 cttacactta tgcttccggc tngttgtgtg ggaattggac ggataccatt tcacncagga 180  
 aacagatatg nccatgatta cgccaagtta tttagggtgcn cgatagaata ctcaagcttg 240  
 gaattcgcg cgcagtcga cggacccccg ggaaagattc ctctcattac acaaaaacca 300  
 gacagtagtg gacgttgacg ttctcacatc ttctctacag gatgagaaag tgaaagaaag 360  
 ctatgtatga agaatcctgt tcatacgggg tggctgaaag taaagaggaa ctgactttc 420  
 ctttgacca tgtgaagtgt tgtggagaaa agagccagaa gttgatgtgg gaagaagtaa 480  
 actggatact gtactgatac tattcaatgc aatgcaatc aatgcaatga aaacaaatt 540  
 ccattacagg ggcagtgccct ttgtagccta tgtcttgat ggctctcaag tgaaagactt 600  
 gaatttagtt ttttacctat acctatgtga aactctatta tggaacccaa tggacatatg 660  
 ggtttgaact cacacttttt tttttttgtt cctgtgtatt ctcatgggg ttgcaacaat 720  
 aattcatcaa gtataaaaaa aaaaaaaa 748

<210> 5

<211> 2011

<212> DNA

<213> Homo sapiens

<400> 5

agaatcctgt tcatactggg gtggcttgaa agtaaattgga ggaactagac tttcctttgc 60  
 accatgtgaa gtgttggtgaa gaaaagagcc agaagttgat gtgggaagaa gtaaactgga 120  
 tactgtactg atactattca atgcaatgca attcaatgca atgaaaaca aattccatta 180  
 caggggcaag tgcctttgta gcccatgtct tgtatggctc tcaagtgaag gacttgaatt 240  
 tagtttttta cctataccta tgtgaaactc tattatggaa cccaatggac atatgggttt 300  
 gaactcacac tttttttttt ttttgttctt gtgtattctc attgggggtg caacaataat 360  
 tcatcaagta atcatggcca gcgattattg atcaaatca aaaggtaatg cacatcctca 420  
 ttcactaagc catgccatgc ccaggagact ggtttcccg tgacacatcc attgctggca 480  
 atgagtgtgc cagagttatt agtgccaagt ttttcagaaa gtttgaagca ccatgggtgtg 540  
 tcatgtcac ttttgtgaaa gctgctctgc tcagagtcta tcaacattga atatcagttg 600  
 acagaatggt gccatgcgtg gctaacatcc tgctttgatt ccctctgata agctgttctg 660  
 gtggcagtaa catgcaacaa aaatgtgggt gtctctaggc acgggaaact tggttccatt 720  
 gttatattgt cctatgcttc gagccatggg tctacagggt catccttatg agactcttaa 780  
 atatacttag atcctggtaa gaggcaaaga atcaacagcc aaactgctgg ggctgcaagc 840  
 tgctgaagcc agggcatggg attaaagaga ttgtgcgttc aaacctaggg aagcctgtgc 900

ccatttgtcc	tgactgtctg	ctat	tggt	acactgcac	tcaagatgtt	tat	gacac	960
aagtgtatta	tttctggctt	tttgaattaa	tctagaaaat	gaaaagatgg	agttgtattt			1020
tgacaaaaat	gtttgtactt	tttaattgta	tttggaattt	taagttctat	cagtgcattc			1080
tgaatcctta	gaatggcctc	tttgtagaac	cctgtgggat	agaggagtat	ggccactgcc			1140
ccactatttt	tattttctta	tgtaagtttg	catatcagtc	atgactagt	cctagaaagc			1200
aatgtgatgg	tcaggatctc	atgacattat	atttgagttt	ctttcagatc	atttaggata			1260
ctcttaatct	cacttcatca	atcaaatatt	ttttgagtg	atgctgtagc	tgaaagagta			1320
tgtacgtacg	tataagacta	gagagatatt	aagtctcagt	acacttcctg	tgccatgtta			1380
ttcagctcac	tggtttacaa	atataggttg	tcttgtgggt	gtaggagccc	actgtaacaa			1440
tattgggcag	cctttttttt	tttttttttt	aattgcaaca	atgcaaaagc	caagaaagta			1500
taagggtcac	aagtctaaac	aatgaattct	tcaacaggga	aaacagctag	ctagaaaact			1560
tgctgaaaac	acaacttggt	tttatggcat	ttagtacctt	caaataattg	gctttgcaga			1620
tattggatac	cccattaaat	ctgacagtct	caaatttttc	atctcttcaa	tcactagtca			1680
agaaaaatat	aaaaacaaca	aatacttcca	tatggagcat	ttttcagagt	tttctaacc			1740
agtcttattt	ttctagtcag	taaacatttg	taaaaatact	gtttcactaa	tacttactgt			1800
taactgtctt	gagagaaaag	aaaaatatga	gagaactatt	gtttggggaa	gttcaagtga			1860
tctttcaata	tcattactaa	cttcttccac	tttttccaaa	atttgaatat	taacgctaaa			1920
gggtgaagga	cttcagattt	caaattaatc	tttctatatt	ttttaattt	acagaatatt			1980
atataacca	ctgctgaaaa	aaaaaaaaa	a					2011

<210> 6

<211> 3366

<212> DNA

<213> Homo sapiens

<400> 6

agaatcctgt	tcatacgggg	tggtgaaag	taaagaggaa	ctagactttc	ctttgcacca	60
tgtgaagtgt	tgtggagaaa	agagccagaa	gttgatgtgg	gaagaagtaa	actggatact	120
gtactgatac	tattcaatgc	aatgcaattc	aatgcaatga	aaacaaaatt	ccattacagg	180
ggcagtgcct	ttgtagccta	tgtcttgtat	ggctctcaag	tgaaagactt	gaatttagtt	240
ttttacctat	acctatgtga	aactctatta	tggaaaccaa	tggacatatg	ggtttgaact	300
cacacttttt	tttttttttt	gttctgtgt	attctcattg	gggttgcaac	aataattcat	360
caagtaatca	tggccagcga	ttattgatca	aaatcaaaag	gtaatgcaca	tcctcattca	420
ctaagccatg	ccatgcccg	gagactgggt	tcccggtgac	acatccattg	ctggcaatga	480
gtgtgccaga	gttattagt	ccaagttttt	cagaaagt	gaagcaccat	ggtgtgtcat	540
gtcactttt	gtgaaagctg	ctctgctcag	agtctatcaa	cattgaatat	cagttgacag	600
aatggtgcca	tgcgtggcta	acatcctgct	ttgattccct	ctgataagct	gttctgggtg	660
cagtaacatg	caacaaaaat	gtgggtgtct	ctaggcacgg	gaaacttgg	tccattgtta	720
tattgtccta	tgcttcgagc	catgggtcta	cagggtcac	cttatgagac	tcttaaatat	780
acttagatcc	tggttaagagg	caaagaatca	acagccaaac	tgctggggct	gcaagctgct	840
gaagccagg	catgggatta	aagagattgt	gcgttcaaac	ctagggaaag	ctgtgcccac	900
ttgtcctgac	tgtctgctaa	catggtacac	tgcatctcaa	gatgtttatc	tgacacaagt	960
gtattatttc	tggctttttg	aattaatcta	gaaaatgaaa	agatggagtt	gtattttgac	1020
aaaaatgttt	gtacttttta	atgttatttg	gaattttaag	ttctatcagt	gacttctgaa	1080
tccttagaat	ggcctctttg	tagaaccctg	tggtatagag	gagtatggcc	actgccccac	1140
tatttttatt	ttcttatgta	agtttgcata	tcagtcatga	ctagtgccta	gaaagcaatg	1200
tgatggctag	gatctcatga	cattatattt	gagtttcttt	cagatcattt	aggatactct	1260
taatctcact	tcatcaatca	aatatttttt	gagtgtatgc	tgtagctgaa	agagtatgta	1320



cgtacgtata agactagaga gatcctaagt ctacgtacac ttctgtgcc atgcaattca 1380  
 gctcactggg ttacaaatat aggttgctct gtggtgtgag gagccactg taacaatat 1440  
 gggcagcctt tttttttttt ttttaattgc aacaatgcaa aagccaagaa agtataagg 1500  
 tcacaagttt aaacaatgaa ttcttcaaca gggaaaacag ctagcttgaa aacttgctga 1560  
 aaaacacaac ttgtgtttat ggcatttagt accttcaa attggtctt gcagatattg 1620  
 gatacccat taaatctgac agtctcaa ttttcatctc ttcaatcact agtcaagaaa 1680  
 aatataaaaa caacaaatac ttccatatgg agcatttttc agagttttct aaccagtct 1740  
 tttttttcta gtcagtaaac atttgtaaaa atactgtttc actaatactt actgttaact 1800  
 gtcttgagag aaaagaaaaa tatgagagaa ctattgtttg gggaagttca agtgatctt 1860  
 caatatcatt actaacttct tccacttttt ccaaaatttg aatattaacg ctaaagggtg 1920  
 aagacttcag atttcaaatt aatctttcta ttttttttaa atttacagaa tattatataa 1980  
 cccactgctg aaaaagaaaa aaatgattgt tttagaagtt aaagtcaata ttgattttaa 2040  
 atataagtaa tgaaggcata tttccaataa ctagtgatat ggcacgttg caatttacag 2100  
 tatcttcaaa aatacagaat ttatagaata atttctctc atttaatat tttcaaaatc 2160  
 aaagtattgg tttctcatt ttactaaaat cgtattctaa ttcttcatta tagtaaact 2220  
 atgagcaact ccttacttct gttctctga tttcaaggcc atatttttaa aaatcaaaag 2280  
 gcaactgtgaa ctattttgaa gaaaacacga cattttaata cagattgaaa ggacctctc 2340  
 tgaagctaga aacaatctat agttatacat cttcattaat actgtgttac cttttaaaat 2400  
 agtaattttt tacattttcc tgtgtaaacc taattgtgg agaaattttt accaactcta 2460  
 tactcaatca agcaaaattt ctgtatattc cctgtggaat gtacctatgt gagtttcaga 2520  
 aattctcaaa atacgtgttc aaaaatttct gcttttgcat ctttgggaca cctcagaaaa 2580  
 cttattaaca actgtgaata tgagaaatac agaagaaaat aataagccct ctatacataa 2640  
 atgcccagca caattcattg ttaaaaaaca accaaacctc acactactgt atttcattat 2700  
 ctgtactgaa agcaaatgct ttgtgactat taaatgttgc acatcattca ttcactgtat 2760  
 agtaatcatt gactaaagcc atttgctgtg ttttcttctt gtggtgnat atatcaggta 2820  
 aaatattttc caaagagcca tgtgtcatgt aatactgaac ctttgatat tgagacatta 2880  
 atttggaccc ttggtattat ctactagaat aatgtaatac tgnagaaata ttgctcta 2940  
 tctttcaaaa tgggtgatcc cccttaaaan gttctatttc cataaggatt tagcttgctt 3000  
 atcccttctt ataccctaag atgaagctgt ttttgtgctc tttgttcac attggccctc 3060  
 attccaagca ctttacgtg tctgtaatgg gatctatttt tgcactggaa tatctgagaa 3120  
 ttgcaaaact agacaaaagt ttcacaacag atttctaagt taaatcatt tcattaaaag 3180  
 gaaaaaagaa aaaaaatttt gtatgtcaat aactttatat gaagtattaa aatgcatatt 3240  
 tctatgttgt aatataatga gtcacaaaat aaagctgtga cagttctgtt aaaaaaaaaa 3300  
 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 3360  
 aaaaaa 3366

<210> 7

<211> 10474

<212> DNA

<213> Homo sapiens

<400> 7

tctagaactg ggtaccagct gctagcaagc ttcggcacga gccgcagagc cgagccgacc 60  
 cttctctccc gggctgcggc agggcagggc ggggagctcc gcgcaccaac agagccggtt 120  
 ctcagggcgc tttgtctcct gttttttccc cggttctgtt ttctccctt ctccggaagg 180  
 cttgtcaagg ggtaggagaa agagacgcaa acacaaaagt ggaaaacagt taatgaccag 240  
 ccacgggcgt cctgtctgtg agctctggcc gctgccttcc agggctccc agccacacgc 300  
 tgggcgtgct ggctgagggg acatggcttg ttggcctcag ctgaggttgc tgctgtggaa 360



gaacctgggg	gtctgtcccc	agcgaacgt	gctgtttgac	atgctgactg	tcggaaca	3300
catctggttc	tatgcccgt	tgaaagggct	ctctgagaag	cacgtgaagg	cggagatgga	3360
gcagatggcc	ctggatgttg	gtttgccatc	aagcaagctg	aaaagcaaaa	caagccagct	3420
gtcaggtgga	atgcagagaa	agctatctgt	ggccttgccc	tttgtcgggg	gatctaaggt	3480
tgtcattctg	gatgaacca	cagctgggtg	ggacccttac	tcccgcaggg	gaatatggga	3540
gctgctgctg	aaataccgac	aaggccgcac	cattattctc	tctacacacc	acatggatga	3600
agcggacgtc	ctgggggaca	ggattgccat	catctcccat	gggaagctgt	gctgtgtggg	3660
ctcctccctg	tttctgaaga	accagctggg	aacaggctac	tacctgacct	tggtaagaa	3720
agatgtggaa	tcctccctca	gttctgcag	aaacagtagt	agcactgtgt	catacctgaa	3780
aaaggaggac	agtgtttctc	agagcagttc	tgatgctggc	ctgggcagcg	accatgagag	3840
tgacacgctg	accatcgatg	tctctgctat	ctccaacctc	atcaggaagc	atgtgtctga	3900
agcccggctg	gtggaagaca	tagggcatga	gctgacctat	gtgctgccat	atgaagctgc	3960
taaggaggga	gcctttgttg	aactctttca	tgagattgat	gaccggctct	cagacctggg	4020
cattttctagt	tatggcatct	cagagacgac	cctggaagaa	atattcctca	aggtggccga	4080
agagagtggg	gtggatgctg	agacctcaga	tggtaacctg	ccagcaagac	gaaacaggcg	4140
ggccttcggg	gacaagcaga	gctgtcttcg	cccgttcaact	gaagatgatg	ctgctgatcc	4200
aaatgattct	gacatagacc	cagaatccag	agagacagac	ttgctcagtg	ggatggatgg	4260
caaaggggtcc	taccaggtga	aaggctggaa	acttacacag	caacagtttg	tggccctttt	4320
gtggaagaga	ctgctaattg	ccagacggag	tcggaaagga	ttttttgctc	agattgtctt	4380
gccagctgtg	tttgtctgca	ttgcccttgt	gttcagcctg	atcgtgccac	cctttggcaa	4440
gtaccccagc	ctggaacttc	agccctggat	gtacaacgaa	cagtacacat	ttgtcagcaa	4500
tgatgctcct	gaggacacgg	gaaccctgga	actcttaaac	gccctcacca	aagaccctgg	4560
cttcggggacc	cgctgtatgg	aaggaaaccc	aatcccagac	acgccctgcc	aggcagggga	4620
ggaagagtgg	accactgccc	cagttcccca	gaccatcatg	gacctcttcc	agaatgggaa	4680
ctggacaatg	cagaaccctt	cacctgcatg	ccagtgtagc	agcgacaaaa	tcaagaagat	4740
gctgcctgtg	tgtccccccag	gggcaggggg	gctgcctcct	ccacaaagaa	aacaaaacac	4800
tgcagatatc	cttcaggacc	tgacaggaag	aaacatttcg	gattatctgg	tgaagacgta	4860
tgtgcagatc	atagccaaaa	gcttaaagaa	caagatctgg	gtgaatgagt	ttaggtatgg	4920
cggcttttcc	ctgggtgtca	gtaataactca	agcacttcct	ccgagtcaag	aagttaatga	4980
tgccatcaaa	caaatgaaga	aacacctaaa	gctggccaag	gacagttctg	cagatcgatt	5040
tctcaacagc	ttgggaagat	ttatgacagg	actggacacc	agaaataatg	tcaaggtgtg	5100
gttcaataac	aagggtcggc	atgcaatcag	ctctttcctg	aatgtcatca	acaatgccat	5160
tctccggggc	aacctgcaaa	agggagagaa	ccctagccat	tatggaatta	ctgctttcaa	5220
tcatcccctg	aatctcacca	agcagcagct	ctcagaggtg	gctctgatga	ccacatcagt	5280
ggatgtcctt	gtgtccatct	gtgtcatctt	tgcaatgtcc	ttcgtcccag	ccagctttgt	5340
cgtattcctg	atccaggagc	gggtcagcaa	agcaaaacac	ctgcagttca	tcagtggagt	5400
gaagcctgtc	atctactggc	tctctaattt	tgtctgggat	atgtgcaatt	acgttgtccc	5460
tgccacactg	gtcattatca	tcttcatctg	cttcacagcag	aagtccctatg	tgtcctccac	5520
caatctgcct	gtgctagccc	ttctactttt	gctgtatggg	tggtaaatca	cacctctcat	5580
gtacccagcc	tcctttgtgt	tcaagatccc	cagcacagcc	tatgtggtgc	tcaccagcgt	5640
gaacctcttc	attggcatta	atggcagcgt	ggccaccttt	gtgctggagc	tggtcaccca	5700
caataagctg	aataatatca	atgatatcct	gaagtccgtg	ttcttgatct	tcccacattt	5760
ttgcctggga	cgagggctca	tcgacatggg	gaaaaaccag	gcaatggctg	atgccctgga	5820
aaggtttggtg	gagaatcgct	ttgtgtcacc	attatcttgg	gacttggtgg	gacgaaacct	5880
cttcgccatg	gccgtggaag	gggtgggtgtt	cttcctcatt	actgttctga	tccagtacag	5940
attcttcatc	aggcccagac	ctgtaaattgc	aaagctatct	cctctgaatg	atgaagatga	6000
agatgtgagg	cgggaaagac	agagaattct	tgatggtgga	ggccagaatg	acatcttaga	6060
aatcaaggag	ttgacgaaga	tatatagaag	gaagcggaag	cctgctgttg	acaggatttg	6120



aaaatttgaa tattaacgct aaagtgttaa gacttcagat ttcaaattaa tcttctata 9060  
 tttttttaat ttacagaata ttatataacc cactgctgaa aaagaaaaaa atgattgttt 9120  
 tagaagttaa agtcaatatt gatttttaaat ataagtaatg aaggcatatt tccaataact 9180  
 agtgatatgg catcgttgca atttacagta tcttcaaaaa tacagaattt atagaataat 9240  
 ttctcctcat ttaatatatt tcaaaatcaa agttatggtt tcttcatttt actaaaatcg 9300  
 tattctaatt cttcattata gtaaattctat gagcaactcc ttacttcggt tctcttgatt 9360  
 tcaaggccat attttaaaaa atcaaaaggc actgtgaact attttgaaga aaacacgaca 9420  
 ttttaataca gattgaaagg acctcttctg aagctagaaa caatctatag ttatacatct 9480  
 tcattaatac tgtgttacct tttaaaatag taatttttta cattttcctg tgtaaacct 9540  
 attgtggtag aaattttttac caactctata ctcaatcaag caaaatttct gtatattccc 9600  
 tgtggaatgt acctatgtga gtttcagaaa ttctcaaaat acgtgttcaa aaatttctgc 9660  
 ttttgcattt ttgggacacc tcagaaaact tattaacaac tgtgaatatg agaaatacag 9720  
 aagaaaataa taagccctct atacataaat gccacgcaca attcattgtt aaaaaacaac 9780  
 caaacctcac actactgtat ttcattatct gtactgaaag caaatgcttt gtgactatta 9840  
 aatgttgcac atcattcatt cactgtatag taatcattga ctaaagccat ttgctgtgtt 9900  
 ttcttcttgt ggntgnatat atcaggtaaa atattttcca aagagccatg tgtcatgtaa 9960  
 tactgaacct tttgatattg agacattaat ttggacctt ggtattatct actagaataa 10020  
 tgtaatactg nagaaatatt gctctaattc tttcaaaatg gtgcatcccc cttaaaangt 10080  
 tctattttcca taaggattta gcttgcttat cccttcttat accctaagat gaagctgttt 10140  
 ttgtgctctt tgttcatcat tggccctcat tccaagcact ttacgctgtc tgtaatggga 10200  
 tctatttttg cactggaata tctgagaatt gcaaaactag acaaaagtgt cacaacagat 10260  
 ttctaagtta aatcattttc attaaaagga aaaaagaaaa aaaattttgt atgtcaataa 10320  
 ctttatatga agtattaaaa tgcataattc tatgttgtaa tataatgagt cacaaaaataa 10380  
 agctgtgaca gttctgttaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 10440  
 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaa 10474

<210> 8

<211> 2261

<212> PRT

<213> Homo sapiens

<400> 8

Met Ala Cys Trp Pro Gln Leu Arg Leu Leu Leu Trp Lys Asn Leu Thr  
 1 5 10 15

Phe Arg Arg Arg Gln Thr Cys Gln Leu Leu Leu Glu Val Ala Trp Pro  
 20 25 30

Leu Phe Ile Phe Leu Ile Leu Ile Ser Val Arg Leu Ser Tyr Pro Pro  
 35 40 45

Tyr Glu Gln His Glu Cys His Phe Pro Asn Lys Ala Met Pro Ser Ala  
 50 55 60

Gly Thr Leu Pro Trp Val Gln Gly Ile Ile Cys Asn Ala Asn Asn Pro  
 65 70 75 80

Cys Phe Arg Tyr Pro Thr Pro Gly Glu Ala Pro Gly Val Val Gly Asn

Phe Asn Lys Ser Ile Val Ala Arg Leu Phe Ser Asp Ala Arg Arg Leu  
100 105 110

Leu Leu Tyr Ser Gln Lys Asp Thr Ser Met Lys Asp Met Arg Lys Val  
115 120 125

Leu Arg Thr Leu Gln Gln Ile Lys Lys Ser Ser Ser Asn Leu Lys Leu  
130 135 140

Gln Asp Phe Leu Val Asp Asn Glu Thr Phe Ser Gly Phe Leu Tyr His  
145 150 155 160

Asn Leu Ser Leu Pro Lys Ser Thr Val Asp Lys Met Leu Arg Ala Asp  
165 170 175

Val Ile Leu His Lys Val Phe Leu Gln Gly Tyr Gln Leu His Leu Thr  
180 185 190

Ser Leu Cys Asn Gly Ser Lys Ser Glu Glu Met Ile Gln Leu Gly Asp  
195 200 205

Gln Glu Val Ser Glu Leu Cys Gly Leu Pro Lys Glu Lys Leu Ala Ala  
210 215 220

Ala Glu Arg Val Leu Arg Ser Asn Met Asp Ile Leu Lys Pro Ile Leu  
225 230 235 240

Arg Thr Leu Asn Ser Thr Ser Pro Phe Pro Ser Lys Glu Leu Ala Glu  
245 250 255

Ala Thr Lys Thr Leu Leu His Ser Leu Gly Thr Leu Ala Gln Glu Leu  
260 265 270

Phe Ser Met Arg Ser Trp Ser Asp Met Arg Gln Glu Val Met Phe Leu  
275 280 285

Thr Asn Val Asn Ser Ser Ser Ser Ser Thr Gln Ile Tyr Gln Ala Val  
290 295 300

Ser Arg Ile Val Cys Gly His Pro Glu Gly Gly Gly Leu Lys Ile Lys  
305 310 315 320

Ser Leu Asn Trp Tyr Glu Asp Asn Asn Tyr Lys Ala Leu Phe Gly Gly  
325 330 335

Asn Gly Thr Glu Glu Asp Ala Glu Thr Phe Tyr Asp Asn Ser Thr Thr

340

345

350

Pro Tyr Cys Asn Asp Leu Met Lys Asn Leu Glu Ser Ser Pro Leu Ser  
355 360 365

Arg Ile Ile Trp Lys Ala Leu Lys Pro Leu Leu Val Gly Lys Ile Leu  
370 375 380

Tyr Thr Pro Asp Thr Pro Ala Thr Arg Gln Val Met Ala Glu Val Asn  
385 390 395 400

Lys Thr Phe Gln Glu Leu Ala Val Phe His Asp Leu Glu Gly Met Trp  
405 410 415

Glu Glu Leu Ser Pro Lys Ile Trp Thr Phe Met Glu Asn Ser Gln Glu  
420 425 430

Met Asp Leu Val Arg Met Leu Leu Asp Ser Arg Asp Asn Asp His Phe  
435 440 445

Trp Glu Gln Gln Leu Asp Gly Leu Asp Trp Thr Ala Gln Asp Ile Val  
450 455 460

Ala Phe Leu Ala Lys His Pro Glu Asp Val Gln Ser Ser Asn Gly Ser  
465 470 475 480

Val Tyr Thr Trp Arg Glu Ala Phe Asn Glu Thr Asn Gln Ala Ile Arg  
485 490 495

Thr Ile Ser Arg Phe Met Glu Cys Val Asn Leu Asn Lys Leu Glu Pro  
500 505 510

Ile Ala Thr Glu Val Trp Leu Ile Asn Lys Ser Met Glu Leu Leu Asp  
515 520 525

Glu Arg Lys Phe Trp Ala Gly Ile Val Phe Thr Gly Ile Thr Pro Gly  
530 535 540

Ser Ile Glu Leu Pro His His Val Lys Tyr Lys Ile Arg Met Asp Ile  
545 550 555 560

Asp Asn Val Glu Arg Thr Asn Lys Ile Lys Asp Gly Tyr Trp Asp Pro  
565 570 575

Gly Pro Arg Ala Asp Pro Phe Glu Asp Met Arg Tyr Val Trp Gly Gly  
580 585 590

Phe Ala Tyr Leu Arg Asp Val Val Glu Gln Ala Ile Ile Arg Val Leu

595

600

605

Thr Gly Thr Glu Lys Lys Thr Gly Val Tyr Met Gln Gln Met Pro Tyr  
 610 615 620

Pro Cys Tyr Val Asp Asp Ile Phe Leu Arg Val Met Ser Arg Ser Met  
 625 630 635 640

Pro Leu Phe Met Thr Leu Ala Trp Ile Tyr Ser Val Ala Val Ile Ile  
 645 650 655

Lys Gly Ile Val Tyr Glu Lys Glu Ala Arg Leu Lys Glu Thr Met Arg  
 660 665 670

Ile Met Gly Leu Asp Asn Ser Ile Leu Trp Phe Ser Trp Phe Ile Ser  
 675 680 685

Ser Leu Ile Pro Leu Leu Val Ser Ala Gly Leu Leu Val Val Ile Leu  
 690 695 700

Lys Leu Gly Asn Leu Leu Pro Tyr Ser Asp Pro Ser Val Val Phe Val  
 705 710 715 720

Phe Leu Ser Val Phe Ala Val Val Thr Ile Leu Gln Cys Phe Leu Ile  
 725 730 735

Ser Thr Leu Phe Ser Arg Ala Asn Leu Ala Ala Ala Cys Gly Gly Ile  
 740 745 750

Ile Tyr Phe Thr Leu Tyr Leu Pro Tyr Val Leu Cys Val Ala Trp Gln  
 755 760 765

Asp Tyr Val Gly Phe Thr Leu Lys Ile Phe Ala Ser Leu Leu Ser Pro  
 770 775 780

Val Ala Phe Gly Phe Gly Cys Glu Tyr Phe Ala Leu Phe Glu Glu Gln  
 785 790 795 800

Gly Ile Gly Val Gln Trp Asp Asn Leu Phe Glu Ser Pro Val Glu Glu  
 805 810 815

Asp Gly Phe Asn Leu Thr Thr Ser Ile Ser Met Met Leu Phe Asp Thr  
 820 825 830

Phe Leu Tyr Gly Val Met Thr Trp Tyr Ile Glu Ala Val Phe Pro Gly  
 835 840 845

Gln Tyr Gly Ile Pro Arg Pro Trp Tyr Phe Pro Cys Thr Lys Ser Tyr



850

8

860

Trp Phe Gly Glu Glu Ser Asp Glu Lys Ser His Pro Gly Ser Asn Gln  
 865 870 875 880

Lys Arg Met Ser Glu Ile Cys Met Glu Glu Glu Pro Thr His Leu Lys  
 885 890 895

Leu Gly Val Ser Ile Gln Asn Leu Val Lys Val Tyr Arg Asp Gly Met  
 900 905 910

Lys Val Ala Val Asp Gly Leu Ala Leu Asn Phe Tyr Glu Gly Gln Ile  
 915 920 925

Thr Ser Phe Leu Gly His Asn Gly Ala Gly Lys Thr Thr Thr Met Ser  
 930 935 940

Ile Leu Thr Gly Leu Phe Pro Pro Thr Ser Gly Thr Ala Tyr Ile Leu  
 945 950 955 960

Gly Lys Asp Ile Arg Ser Glu Met Ser Thr Ile Arg Gln Asn Leu Gly  
 965 970 975

Val Cys Pro Gln His Asn Val Leu Phe Asp Met Leu Thr Val Glu Glu  
 980 985 990

His Ile Trp Phe Tyr Ala Arg Leu Lys Gly Leu Ser Glu Lys His Val  
 995 1000 1005

Lys Ala Glu Met Glu Gln Met Ala Leu Asp Val Gly Leu Pro Ser Ser  
 1010 1015 1020

Lys Leu Lys Ser Lys Thr Ser Gln Leu Ser Gly Gly Met Gln Arg Lys  
 1025 1030 1035 1040

Leu Ser Val Ala Leu Ala Phe Val Gly Gly Ser Lys Val Val Ile Leu  
 1045 1050 1055

Asp Glu Pro Thr Ala Gly Val Asp Pro Tyr Ser Arg Arg Gly Ile Trp  
 1060 1065 1070

Glu Leu Leu Leu Lys Tyr Arg Gln Gly Arg Thr Ile Ile Leu Ser Thr  
 1075 1080 1085

His His Met Asp Glu Ala Asp Val Leu Gly Asp Arg Ile Ala Ile Ile  
 1090 1095 1100

Ser His Gly Lys Leu Cys Cys Val Gly Ser Ser Leu Phe Leu Lys Asn

1105

1110

1115

1120

Gln Leu Gly Thr Gly Tyr Tyr Leu Thr Leu Val Lys Lys Asp Val Glu  
 1125 1130 1135

Ser Ser Leu Ser Ser Cys Arg Asn Ser Ser Ser Thr Val Ser Tyr Leu  
 1140 1145 1150

Lys Lys Glu Asp Ser Val Ser Gln Ser Ser Ser Asp Ala Gly Leu Gly  
 1155 1160 1165

Ser Asp His Glu Ser Asp Thr Leu Thr Ile Asp Val Ser Ala Ile Ser  
 1170 1175 1180

Asn Leu Ile Arg Lys His Val Ser Glu Ala Arg Leu Val Glu Asp Ile  
 1185 1190 1195 1200

Gly His Glu Leu Thr Tyr Val Leu Pro Tyr Glu Ala Ala Lys Glu Gly  
 1205 1210 1215

Ala Phe Val Glu Leu Phe His Glu Ile Asp Asp Arg Leu Ser Asp Leu  
 1220 1225 1230

Gly Ile Ser Ser Tyr Gly Ile Ser Glu Thr Thr Leu Glu Glu Ile Phe  
 1235 1240 1245

Leu Lys Val Ala Glu Glu Ser Gly Val Asp Ala Glu Thr Ser Asp Gly  
 1250 1255 1260

Thr Leu Pro Ala Arg Arg Asn Arg Arg Ala Phe Gly Asp Lys Gln Ser  
 1265 1270 1275 1280

Cys Leu Arg Pro Phe Thr Glu Asp Asp Ala Ala Asp Pro Asn Asp Ser  
 1285 1290 1295

Asp Ile Asp Pro Glu Ser Arg Glu Thr Asp Leu Leu Ser Gly Met Asp  
 1300 1305 1310

Gly Lys Gly Ser Tyr Gln Val Lys Gly Trp Lys Leu Thr Gln Gln Gln  
 1315 1320 1325

Phe Val Ala Leu Leu Trp Lys Arg Leu Leu Ile Ala Arg Arg Ser Arg  
 1330 1335 1340

Lys Gly Phe Phe Ala Gln Ile Val Leu Pro Ala Val Phe Val Cys Ile  
 1345 1350 1355 1360

Ala Leu Val Phe Ser Leu Ile Val Pro Pro Phe Gly Lys Tyr Pro Ser

1365

1370

1375

Leu Glu Leu Gln Pro Trp Met Tyr Asn Glu Gln Tyr Thr Phe Val Ser  
 1380 1385 1390

Asn Asp Ala Pro Glu Asp Thr Gly Thr Leu Glu Leu Leu Asn Ala Leu  
 1395 1400 1405

Thr Lys Asp Pro Gly Phe Gly Thr Arg Cys Met Glu Gly Asn Pro Ile  
 1410 1415 1420

Pro Asp Thr Pro Cys Gln Ala Gly Glu Glu Glu Trp Thr Thr Ala Pro  
 1425 1430 1435 1440

Val Pro Gln Thr Ile Met Asp Leu Phe Gln Asn Gly Asn Trp Thr Met  
 1445 1450 1455

Gln Asn Pro Ser Pro Ala Cys Gln Cys Ser Ser Asp Lys Ile Lys Lys  
 1460 1465 1470

Met Leu Pro Val Cys Pro Pro Gly Ala Gly Gly Leu Pro Pro Pro Gln  
 1475 1480 1485

Arg Lys Gln Asn Thr Ala Asp Ile Leu Gln Asp Leu Thr Gly Arg Asn  
 1490 1495 1500

Ile Ser Asp Tyr Leu Val Lys Thr Tyr Val Gln Ile Ile Ala Lys Ser  
 1505 1510 1515 1520

Leu Lys Asn Lys Ile Trp Val Asn Glu Phe Arg Tyr Gly Gly Phe Ser  
 1525 1530 1535

Leu Gly Val Ser Asn Thr Gln Ala Leu Pro Pro Ser Gln Glu Val Asn  
 1540 1545 1550

Asp Ala Ile Lys Gln Met Lys Lys His Leu Lys Leu Ala Lys Asp Ser  
 1555 1560 1565

Ser Ala Asp Arg Phe Leu Asn Ser Leu Gly Arg Phe Met Thr Gly Leu  
 1570 1575 1580

Asp Thr Arg Asn Asn Val Lys Val Trp Phe Asn Asn Lys Gly Trp His  
 1585 1590 1595 1600

Ala Ile Ser Ser Phe Leu Asn Val Ile Asn Asn Ala Ile Leu Arg Ala  
 1605 1610 1615

Asn Leu Gln Lys Gly Glu Asn Pro Ser His Tyr Gly Ile Thr Ala Phe

1620

1625

1630

Asn His Pro Leu Asn Leu Thr Lys Gln Gln Leu Ser Glu Val Ala Leu  
 1635 1640 1645

Met Thr Thr Ser Val Asp Val Leu Val Ser Ile Cys Val Ile Phe Ala  
 1650 1655 1660

Met Ser Phe Val Pro Ala Ser Phe Val Val Phe Leu Ile Gln Glu Arg  
 1665 1670 1675 1680

Val Ser Lys Ala Lys His Leu Gln Phe Ile Ser Gly Val Lys Pro Val  
 1685 1690 1695

Ile Tyr Trp Leu Ser Asn Phe Val Trp Asp Met Cys Asn Tyr Val Val  
 1700 1705 1710

Pro Ala Thr Leu Val Ile Ile Ile Phe Ile Cys Phe Gln Gln Lys Ser  
 1715 1720 1725

Tyr Val Ser Ser Thr Asn Leu Pro Val Leu Ala Leu Leu Leu Leu  
 1730 1735 1740

Tyr Gly Trp Ser Ile Thr Pro Leu Met Tyr Pro Ala Ser Phe Val Phe  
 1745 1750 1755 1760

Lys Ile Pro Ser Thr Ala Tyr Val Val Leu Thr Ser Val Asn Leu Phe  
 1765 1770 1775

Ile Gly Ile Asn Gly Ser Val Ala Thr Phe Val Leu Glu Leu Phe Thr  
 1780 1785 1790

Asp Asn Lys Leu Asn Asn Ile Asn Asp Ile Leu Lys Ser Val Phe Leu  
 1795 1800 1805

Ile Phe Pro His Phe Cys Leu Gly Arg Gly Leu Ile Asp Met Val Lys  
 1810 1815 1820

Asn Gln Ala Met Ala Asp Ala Leu Glu Arg Phe Gly Glu Asn Arg Phe  
 1825 1830 1835 1840

Val Ser Pro Leu Ser Trp Asp Leu Val Gly Arg Asn Leu Phe Ala Met  
 1845 1850 1855

Ala Val Glu Gly Val Val Phe Phe Leu Ile Thr Val Leu Ile Gln Tyr  
 1860 1865 1870

Arg Phe Phe Ile Arg Pro Arg Pro Val Asn Ala Lys Leu Ser Pro Leu

1875

1880

1885

Asn Asp Glu Asp Glu Asp Val Arg Arg Glu Arg Gln Arg Ile Leu Asp  
 1890 1895 1900

Gly Gly Gly Gln Asn Asp Ile Leu Glu Ile Lys Glu Leu Thr Lys Ile  
 1905 1910 1915 1920

Tyr Arg Arg Lys Arg Lys Pro Ala Val Asp Arg Ile Cys Val Gly Ile  
 1925 1930 1935

Pro Pro Gly Glu Cys Phe Gly Leu Leu Gly Val Asn Gly Ala Gly Lys  
 1940 1945 1950

Ser Ser Thr Phe Lys Met Leu Thr Gly Asp Thr Thr Val Thr Arg Gly  
 1955 1960 1965

Asp Ala Phe Leu Asn Lys Asn Ser Ile Leu Ser Asn Ile His Glu Val  
 1970 1975 1980

His Gln Asn Met Gly Tyr Cys Pro Gln Phe Asp Ala Ile Thr Glu Leu  
 1985 1990 1995 2000

Leu Thr Gly Arg Glu His Val Glu Phe Phe Ala Leu Leu Arg Gly Val  
 2005 2010 2015

Pro Glu Lys Glu Val Gly Lys Val Gly Glu Trp Ala Ile Arg Lys Leu  
 2020 2025 2030

Gly Leu Val Lys Tyr Gly Glu Lys Tyr Ala Gly Asn Tyr Ser Gly Gly  
 2035 2040 2045

Asn Lys Arg Lys Leu Ser Thr Ala Met Ala Leu Ile Gly Gly Pro Pro  
 2050 2055 2060

Val Val Phe Leu Asp Glu Pro Thr Thr Gly Met Asp Pro Lys Ala Arg  
 2065 2070 2075 2080

Arg Phe Leu Trp Asn Cys Ala Leu Ser Val Val Lys Glu Gly Arg Ser  
 2085 2090 2095

Val Val Leu Thr Ser His Ser Met Glu Glu Cys Glu Ala Leu Cys Thr  
 2100 2105 2110

Arg Met Ala Ile Met Val Asn Gly Arg Phe Arg Cys Leu Gly Ser Val  
 2115 2120 2125

Gln His Leu Lys Asn Arg Phe Gly Asp Gly Tyr Thr Ile Val Val Arg

2130

2140

2150

Ile Ala Gly Ser Asn Pro Asp Leu Lys Pro Val Gln Asp Phe Phe Gly  
 2145 2150 2155 2160

Leu Ala Phe Pro Gly Ser Val Leu Lys Glu Lys His Arg Asn Met Leu  
 2165 2170 2175

Gln Tyr Gln Leu Pro Ser Ser Leu Ser Ser Leu Ala Arg Ile Phe Ser  
 2180 2185 2190

Ile Leu Ser Gln Ser Lys Lys Arg Leu His Ile Glu Asp Tyr Ser Val  
 2195 2200 2205

Ser Gln Thr Thr Leu Asp Gln Val Phe Val Asn Phe Ala Lys Asp Gln  
 2210 2215 2220

Ser Asp Asp Asp His Leu Lys Asp Leu Ser Leu His Lys Asn Gln Thr  
 2225 2230 2235 2240

Val Val Asp Val Ala Val Leu Thr Ser Phe Leu Gln Asp Glu Lys Val  
 2245 2250 2255

Lys Glu Ser Tyr Val  
 2260

&lt;210&gt; 9

&lt;211&gt; 10474

&lt;212&gt; DNA

&lt;213&gt; Homo sapiens

&lt;400&gt; 9

tctagaactg ggtaccagct gctagcaagc ttcggcacga gccgcagagc cgagccgacc 60  
 cttctctccc gggctgcggc agggcagggc ggggagctcc gcgcaccaac agagccggtt 120  
 ctcagggcgc tttgctcctt gttttttccc cggttctgtt ttctcccctt ctccggaagg 180  
 cttgtcaagg ggtaggagaa agagacgcaa acacaaaagt ggaaaacagt taatgaccag 240  
 ccacgggcgt ccttgcctgt agctctggcc gctgccttcc agggctccc agccacacgc 300  
 tgggcgtgct ggctgaggga acatggcttg ttggcctcag ctgaggttgc tgctgtggaa 360  
 gaacctcact ttcagaagaa gacaaacatg tcagctgtta ctggaagtgg cctggcctct 420  
 atttatcttc ctgatctga tctctgttcg gctgagctac ccaccctatg aacaacatga 480  
 atgccatttt ccaaataaag ccatgccctc tgcaggaaca ctcccttggg ttcaggggat 540  
 tatctgtaat gccacaacc cctgtttccg ttaccgcact cctggggagg ctcccggagt 600  
 tgttggaaac ttaacaaat ccattgtggc tcgcctgttc tcagatgtc ggaggcttct 660  
 ttatacagc cagaaagaca ccagcatgaa ggacatgcgc aaagtcttga gaacattaca 720  
 gcagatcaag aaatccagct caaacttgaa gcttcaagat ttcttggtgg acaatgaaac 780  
 cttctctggg ttcttatatc acaacctctc tctcccaaag tctactgtgg acaagatgct 840  
 gagggctgat gtcattctcc acaagggtatt tttgcaaggc taccagttac atttgacaag 900

tctgtgcaat ggatcaaaat cagagagat gattcaactt ggtgaccaag aagctctga 960  
 gctttgtggc ctaccaaagg agaaactggc tgcagcagag cgagtacttc gttccaacat 1020  
 ggacatcctg aagccaatcc tgagaacact aaactctaca tctcccttcc cgagcaagga 1080  
 gctggctgaa gccacaaaaa cattgctgca tagtcttggg actctggccc aggagctgtt 1140  
 cagcatgaga agctggagtg acatgcgaca ggaggtgatg tttctgacca atgtgaacag 1200  
 ctccagctcc tccacccaaa tctaccaggc tgtgtctcgt attgtctgcg ggcattccga 1260  
 gggagggggg ctgaagatca agtctctcaa ctggtatgag gacaacaact acaaagccct 1320  
 ctttgagggc aatggcactg aggaagatgc tgaaaccttc tatgacaact ctacaactcc 1380  
 ttactgcaat gatttgatga agaatttggg gtctagtcct ctttcccga ttatctggaa 1440  
 agctctgaag ccgctgctcg ttgggaagat cctgtataca cctgacactc cagccacaag 1500  
 gcaggtcatg gctgaggtga acaagacctt ccaggaactg gctgtgttcc atgatctgga 1560  
 aggcatgtgg gaggaactca gcccacaagat ctggaccttc atggagaaca gccaaagaaat 1620  
 ggaccttgct cggatgctgt tggacagcag ggacaatgac cacttttggg aacagcagtt 1680  
 ggatggctta gattggacag cccaagacat cgtggcggtt ttggccaagc acccagagga 1740  
 tgtccagtcc agtaatggtt ctgtgtacac ctggagagaa gctttcaacg agactaacca 1800  
 ggcaatccgg accatatctc gcttcatgga gtgtgtcaac ctgaacaagc tagaaccat 1860  
 agcaacagaa gtctggtcga tcaacaagtc catggagctg ctggatgaga ggaagttctg 1920  
 ggctggtatt gtgttactg gaattactcc aggcagcatt gagctgcccc atcatgtcaa 1980  
 gtacaagatc cgaatggaca ttgacaatgt ggagaggaca aataaaatca aggatgggta 2040  
 ctgggacctt ggtcctcgag ctgacctt tgaggacatg tggtagctct gggggggctt 2100  
 cgctacttg caggatgtgg tggagcaggc aatcatcagg gtgctgacgg gcaccgagaa 2160  
 gaaaactggt gtctatatgc aacagatgcc ctatccctgt tacgttgatg acatctttct 2220  
 gcgggtgatg agccggtcaa tgccctctt catgacgctg gcctggattt actcagtggc 2280  
 tgtgatcatc aagggcatcg tgtatgagaa ggaggcacgg ctgaaagaga ccatgcggat 2340  
 catgggcctg gacaacagca tactctgggt tagctgggtc attagtagcc tcatctctct 2400  
 tcttgtgagc gctggcctgc tagtggatc cctgaagtta ggaaacctgc tgccctacag 2460  
 tgatcccagc gtgggtgttg tcttctgtc cgtgtttgct gtggtgacaa tcttgcagt 2520  
 ctctctgatt agcacactct tctccagagc caacctggca gcagcctgtg ggggcatcat 2580  
 ctacttcacg ctgtacctgc cctacgtcct gtgtgtggca tggcaggact acgtgggctt 2640  
 cacactcaag atcttcgcta gcctgctgtc tctgtggct tttgggttg gctgtgagta 2700  
 ctttgccctt tttgaggagc agggcattgg agtgagtg gacaacctgt ttgagagtcc 2760  
 tgtggaggaa gatggcttca atctcaccac ttcgatctcc atgatgctgt ttgacacctt 2820  
 cctctatggg gtgatgacct ggtacattga ggctgtctt ccaggccagt acggaattcc 2880  
 caggccctgg tattttcctt gcaccaagtc ctactggtt ggcgaggaaa gtgatgagaa 2940  
 gagccacct ggtccaacc agaagagaat gtcagaaatc tgcatggagg aggaaccac 3000  
 ccacttgaag ctgggcgtgt ccattcagaa cctggtaaaa gtctaccgag atgggatgaa 3060  
 ggtggctgtc gatggcctgg cactgaattt ttatgagggc cagatcacct ctttctggg 3120  
 ccacaatgga gcggggaaga cgaccacat gtcaatcctg accgggttg tcccccgac 3180  
 ctggggcacc gctacatcc tgggaaaaga cattcgctct gagatgagca ccatccggca 3240  
 gaacctggg gtctgtcccc agcataacgt gctgtttgac atgctgactg tcgaagaaca 3300  
 catctggttc tatgcccgt tgaaagggct ctctgagaag cacgtgaagg cgagatgga 3360  
 gcagatggcc ctggatgttg gtttgccatc aagcaagctg aaaagcaaaa caagccagct 3420  
 gtcaggtgga atgcagagaa agctatctgt ggccttggcc tttgtcggg gatctaaggt 3480  
 tgtcattctg gatgaacca cagctggtgt ggaccttac tccgcaggg gaatatggga 3540  
 gctgctgctg aaataccgac aaggccgcac cattattctc tctacacacc acatggatga 3600  
 agcggacgtc ctgggggaca ggattgccat catctcccat gggaagctgt gctgtgtggg 3660  
 ctctccctg tttctgaaga accagctggg aacaggctac tacctgacct tggtaagaa 3720  
 agatgtggaa tctcctca gttcctgcag aaacagtagt agcactgtgt catacctgaa 3780

aaggaggac	agtgtttctc	agtgagttc	tgatgctggc	ctgggcagcg	acggagag	3840
tgacacgctg	accatcgatg	tctctgctat	ctccaacctc	atcaggaagc	atgtgtctga	3900
agccccggctg	gtggaagaca	tagggcatga	gctgacctat	gtgctgccat	atgaagctgc	3960
taaggaggga	gcctttgtgg	aactctttca	tgagattgat	gaccggctct	cagacctggg	4020
catttctagt	tatggcatct	cagagacgac	cctggaagaa	atattcctca	aggtggccga	4080
agagagtggg	gtggatgctg	agacctcaga	tggtaccttg	ccagcaagac	gaaacaggcg	4140
ggccttcggg	gacaagcaga	gctgtcttcg	cccgttcact	gaagatgatg	ctgctgatcc	4200
aaatgattct	gacatagacc	cagaatccag	agagacagac	ttgctcagtg	ggatggatgg	4260
caaaggggcc	taccaggtga	aaggctggaa	acttacacag	caacagtttg	tggccctttt	4320
gtggaagaga	ctgctaattg	ccagacggag	tcggaaagga	ttttttgctc	agattgtctt	4380
gccagctgtg	tttgtctgca	ttgcccttgt	gttcagcctg	atcgtgccac	cctttggcaa	4440
gtaccccagc	ctggaacttc	agccctggat	gtacaacgaa	cagtacacat	ttgtcagcaa	4500
tgatgctcct	gaggacacgg	gaaccttgga	actcttaaac	gccctcacca	aagaccttgg	4560
cttcgggacc	cgctgtatgg	aaggaaaccc	aatcccagac	acgccctgcc	aggcagggga	4620
ggaagagtgg	accactgccc	cagttcccca	gaccatcatg	gacctcttcc	agaatgggaa	4680
ctggacaatg	cagaaccctt	cacctgcatg	ccagtgtagc	agcgacaaaa	tcaagaagat	4740
gctgcctgtg	tgtcccccag	gggcaggggg	gctgcctcct	ccacaaagaa	aacaaaacac	4800
tgcagatatc	cttcaggacc	tgacaggaag	aaacatttcg	gattatctgg	tgaagacgta	4860
tgtgcagatc	atagccaaaa	gcttaaagaa	caagatctgg	gtgaatgagt	ttaggtatgg	4920
cggcttttcc	ctgggtgtca	gtaatactca	agcacttcct	ccgagtcaag	aagttaatga	4980
tgccatcaaa	caaataagaa	aacacctaaa	gctggccaag	gacagtctctg	cagatcgatt	5040
tctcaacagc	ttgggaagat	ttatgacagg	actggacacc	agaaataatg	tcaaggtgtg	5100
gttcaataac	aagggtctgg	atgcaatcag	ctctttcctg	aatgtcatca	acaatgccat	5160
tctccgggcc	aacctgcaaa	agggagagaa	ccctagccat	tatggaatta	ctgctttcaa	5220
tcatccccctg	aatctcacca	agcagcagct	ctcagagggtg	gctctgatga	ccacatcagt	5280
ggatgtcctt	gtgtccatct	gtgtcatctt	tgcaatgtcc	ttcgtcccag	ccagctttgt	5340
cgtattcctg	atccaggagc	gggtcagcaa	agcaaaacac	ctgcagttca	tcagtggagt	5400
gaagcctgtc	atctactggc	tctctaattt	tgtctgggat	atgtgcaatt	acgttgtccc	5460
tgccacactg	gtcattatca	tcttcatctg	cttcacagcag	aagtcctatg	tgtcctccac	5520
caatctgcct	gtgctagccc	ttctactttt	gctgtatggg	tggtcfaatca	cacctctcat	5580
gtaccagacc	tccttttgtgt	tcaagatccc	cagcacagcc	tatgtgggtgc	tcaccagcgt	5640
gaacctcttc	attggcatta	atggcagcgt	ggccaccttt	gtgctggagc	tgttcaccga	5700
caataagctg	aataatatca	atgatatcct	gaagtcctgtg	ttcttgatct	ttccacattt	5760
ttgcctggga	cgagggtcca	tcgacatggt	gaaaaaccag	gcaatggctg	atgccctgga	5820
aaggtttggg	gagaatcgct	ttgtgtcacc	attatcttgg	gacttgggtg	gacgaaacct	5880
cttcgccatg	gccgtggaag	gggtggtgtt	cttcctcatt	actgttctga	tccagtacag	5940
attcttcatc	aggcccagac	ctgtaaatgc	aaagctatct	cctctgaatg	atgaagatga	6000
agatgtgagg	cgggaaagac	agagaattct	tgatggtgga	ggccagaatg	acatcttaga	6060
aatcaaggag	ttgacgaaga	tatatagaag	gaagcggaag	cctgctgttg	acaggatttg	6120
cgtgggcatt	cctcctgggtg	agtgccttgg	gctcctggga	gttaatgggg	ctggaaaatc	6180
atcaactttc	aagatgttaa	caggagatac	cactgttacc	agaggagatg	ctttccttaa	6240
caaaaatagt	atcttatcaa	acatccatga	agtacatcag	aacatgggct	actgccctca	6300
gtttgatgcc	atcacagagc	tgttgactgg	gagagaacac	gtggagttct	ttgccctttt	6360
gagaggagtc	ccagagaaaag	aagttggcaa	ggttgggtgag	tgggcgattc	ggaaactggg	6420
cctcgtgaag	tatggagaaa	aatatgctgg	taactatagt	ggaggcaaca	aacgcaagct	6480
ctctacagcc	atggctttga	tcggcgggcc	tcctgtgggtg	tttctggatg	aaccaccac	6540
aggcatggat	cccaaagccc	ggcggttctt	gtggaattgt	gccctaagtg	ttgtcaagga	6600
ggggagatca	gtagtgcctta	catctcatag	tatggaagaa	tgtgaagctc	tttgactacg	6660



gatggcaatc atggtcaatg gatcttcag gtgccttggc agtgtccagc atcaaaaa 6720  
 taggtttgga gatggttata caatagttgt acgaatagca ggggtccaacc cggacctgaa 6780  
 gcctgtccag gattttctttg gacttgcatt tcctggaagt gttctaaaaag agaaacaccg 6840  
 gaacatgcta caataccagc ttccatcttc attatcttct ctggccagga tattcagcat 6900  
 cctctcccag agcaaaaaagc gactccacat agaagactac tctgtttctc agacaacact 6960  
 tgaccaagta tttgtgaact ttgccaagga ccaaagtgat gatgaccact taaaagacct 7020  
 ctctattacac aaaaaccaga cagtagtgga cggtgcagtt ctcacatctt ttctacagga 7080  
 tgagaaagtg aaagaaagct atgtatgaag aatcctgttc atacggggtg gctgaaagta 7140  
 aagaggaact agactttctt ttgcaccatg tgaagtgttg tggagaaaag agccagaagt 7200  
 tgatgtggga agaagtaaac tggatactgt actgatacta ttcaatgcaa tgcaattcaa 7260  
 tgcaatgaaa acaaaattcc attacagggg cagtgccttt gtagcctatg tcttgtatgg 7320  
 ctctcaagtg aaagacttga atttagtttt ttacctatac ctatgtgaaa ctctattatg 7380  
 gaacccaatg gacatatggg tttgaactca cacttttttt ttttttttgt tcctgtgtat 7440  
 tctcattggg gttgcaacaa taattcatca agtaatcatg gccagcgatt attgatcaaa 7500  
 atcaaaaagg aatgcacatc ctcatctact aagccatgcc atgcccagga gactgggtttc 7560  
 ccggtgacac atccattgct ggcaatgagt gtgccagagt tattagtgcc aagtttttca 7620  
 gaaagtttga agcaccatgg tgtgtcatgc tcacttttgt gaaagctgct ctgctcagag 7680  
 tctatcaaca ttgaatatca gttgacagaa tgggtgccatg cgtgggctaac atcctgcttt 7740  
 gattccctct gataagctgt tctgggtggc gtaacatgca acaaaaatgt ggggtgtctct 7800  
 aggcacggga aacttggttc cattgttata ttgtcctatg cttcgagcca tgggtctaca 7860  
 gggtcactct tatgagactc ttaaatatac ttagatcctg gtaagaggca aagaatcaac 7920  
 agccaaactg ctggggctgc aagctgctga agccagggca tgggattaaa gagattgtgc 7980  
 gttcaaact agggaagcct gtgcccattt gtctgactg tctgctaaca tggtagactg 8040  
 catctcaaga tgtttatctg acacaagtgt attatttctg gctttttgaa ttaattctaga 8100  
 aaatgaaaag atggagtgtt attttgacaa aaatgtttgt actttttaat gttatttgga 8160  
 attttaagtt ctatcagtga cttctgaatc cttagaatgg cctctttgta gaacctgtg 8220  
 gtatagagga gtatggccac tgcccacta tttttatttt cttatgtaag tttgcatatc 8280  
 agtcatgact agtgcctaga aagcaatgtg atggtcagga tctcatgaca ttatatttga 8340  
 gtttctttca gatcatttag gatactctta atctcacttc atcaatcaaa ttttttttga 8400  
 gtgtatgctg tagctgaaag agtatgtacg tacgtataag actagagaga tattaagtct 8460  
 cagtacactt cctgtgccat gttattcagc tcactggttt acaaatatag gttgtcttgt 8520  
 ggtttagtag gccactgta acaatattgg gcagcctttt tttttttttt ttaattgcaa 8580  
 caatgcaaaa gccaaagaaag tataagggtc acaagtttaa acaatgaatt cttcaacagg 8640  
 gaaaacagct agcttgaaaa cttgctgaaa aacacaactt gtgtttatgg catttagtac 8700  
 cttcaaataa ttggctttgc agatattgga taccattta aatctgacag tctcaaattt 8760  
 ttcactctct caatcactag tcaagaaaaa tataaaaaa acaaatactt ccatatggag 8820  
 catttttctag agttttctaa ccagctctta tttttctagt cagttaaact ttgtaaaaat 8880  
 actgtttcac taatacttac tgttaactgt cttgagagaa aagaaaaata tgagagaact 8940  
 attgtttggg gaagtccaag tgatctttca atatcattac taacttcttc cactttttcc 9000  
 aaaatttgaa tattaacgct aaagggtgta gacttcagat ttcaaattaa tctttctata 9060  
 ttttttaaat ttacagaata ttatataacc cactgctgaa aaagaaaaaa atgattgttt 9120  
 tagaagttaa agtcaatatt gatttttaaat ataagtaatg aaggcatatt tccaataact 9180  
 agtgatatgg catcggttga atttacagta tcttcaaaaa tacagaattt atagaataat 9240  
 ttctctcat ttaatatatt tcaaaatcaa agttatggtt tcctcatttt actaaaatcg 9300  
 tattctaatt cttcattata gtaaatctat gagcaactcc ttacttcggt tcctctgatt 9360  
 tcaaggccat attttaaaaa atcaaaaggc actgtgaact attttgaaga aaacacgaca 9420  
 ttttaataca gattgaaagg acctcttctg aagctagaaa caatctatag ttatacatct 9480  
 tcattaatac tgtgttacct tttaaaatag taatttttta cattttcctg tgtaaaccta 9540



130

140

Gln Asp Phe Leu Val Asp Asn Glu Thr Phe Ser Gly Phe Leu Tyr His  
 145 150 155 160

Asn Leu Ser Leu Pro Lys Ser Thr Val Asp Lys Met Leu Arg Ala Asp  
 165 170 175

Val Ile Leu His Lys Val Phe Leu Gln Gly Tyr Gln Leu His Leu Thr  
 180 185 190

Ser Leu Cys Asn Gly Ser Lys Ser Glu Glu Met Ile Gln Leu Gly Asp  
 195 200 205

Gln Glu Val Ser Glu Leu Cys Gly Leu Pro Lys Glu Lys Leu Ala Ala  
 210 215 220

Ala Glu Arg Val Leu Arg Ser Asn Met Asp Ile Leu Lys Pro Ile Leu  
 225 230 235 240

Arg Thr Leu Asn Ser Thr Ser Pro Phe Pro Ser Lys Glu Leu Ala Glu  
 245 250 255

Ala Thr Lys Thr Leu Leu His Ser Leu Gly Thr Leu Ala Gln Glu Leu  
 260 265 270

Phe Ser Met Arg Ser Trp Ser Asp Met Arg Gln Glu Val Met Phe Leu  
 275 280 285

Thr Asn Val Asn Ser Ser Ser Ser Ser Thr Gln Ile Tyr Gln Ala Val  
 290 295 300

Ser Arg Ile Val Cys Gly His Pro Glu Gly Gly Gly Leu Lys Ile Lys  
 305 310 315 320

Ser Leu Asn Trp Tyr Glu Asp Asn Asn Tyr Lys Ala Leu Phe Gly Gly  
 325 330 335

Asn Gly Thr Glu Glu Asp Ala Glu Thr Phe Tyr Asp Asn Ser Thr Thr  
 340 345 350

Pro Tyr Cys Asn Asp Leu Met Lys Asn Leu Glu Ser Ser Pro Leu Ser  
 355 360 365

Arg Ile Ile Trp Lys Ala Leu Lys Pro Leu Leu Val Gly Lys Ile Leu  
 370 375 380

Tyr Thr Pro Asp Thr Pro Ala Thr Arg Gln Val Met Ala Glu Val Asn

400

Pro Leu Phe Met Thr Leu Ala Trp Ile Tyr Ser Val Ala Val Ile Ile

645

650

655

Lys Gly Ile Val Tyr Glu Lys Glu Ala Arg Leu Lys Glu Thr Met Arg  
 660 665 670

Ile Met Gly Leu Asp Asn Ser Ile Leu Trp Phe Ser Trp Phe Ile Ser  
 675 680 685

Ser Leu Ile Pro Leu Leu Val Ser Ala Gly Leu Leu Val Val Ile Leu  
 690 695 700

Lys Leu Gly Asn Leu Leu Pro Tyr Ser Asp Pro Ser Val Val Phe Val  
 705 710 715 720

Phe Leu Ser Val Phe Ala Val Val Thr Ile Leu Gln Cys Phe Leu Ile  
 725 730 735

Ser Thr Leu Phe Ser Arg Ala Asn Leu Ala Ala Ala Cys Gly Gly Ile  
 740 745 750

Ile Tyr Phe Thr Leu Tyr Leu Pro Tyr Val Leu Cys Val Ala Trp Gln  
 755 760 765

Asp Tyr Val Gly Phe Thr Leu Lys Ile Phe Ala Ser Leu Leu Ser Pro  
 770 775 780

Val Ala Phe Gly Phe Gly Cys Glu Tyr Phe Ala Leu Phe Glu Glu Gln  
 785 790 795 800

Gly Ile Gly Val Gln Trp Asp Asn Leu Phe Glu Ser Pro Val Glu Glu  
 805 810 815

Asp Gly Phe Asn Leu Thr Thr Ser Ile Ser Met Met Leu Phe Asp Thr  
 820 825 830

Phe Leu Tyr Gly Val Met Thr Trp Tyr Ile Glu Ala Val Phe Pro Gly  
 835 840 845

Gln Tyr Gly Ile Pro Arg Pro Trp Tyr Phe Pro Cys Thr Lys Ser Tyr  
 850 855 860

Trp Phe Gly Glu Glu Ser Asp Glu Lys Ser His Pro Gly Ser Asn Gln  
 865 870 875 880

Lys Arg Met Ser Glu Ile Cys Met Glu Glu Glu Pro Thr His Leu Lys  
 885 890 895

Leu Gly Val Ser Ile Gln Asn Leu Val Lys Val Tyr Arg Asp Gly Met

900

905

910

Lys Val Ala Val Asp Gly Leu Ala Leu Asn Phe Tyr Glu Gly Gln Ile  
 915 920 925

Thr Ser Phe Leu Gly His Asn Gly Ala Gly Lys Thr Thr Thr Met Ser  
 930 935 940

Ile Leu Thr Gly Leu Phe Pro Pro Thr Ser Gly Thr Ala Tyr Ile Leu  
 945 950 955 960

Gly Lys Asp Ile Arg Ser Glu Met Ser Thr Ile Arg Gln Asn Leu Gly  
 965 970 975

Val Cys Pro Gln His Asn Val Leu Phe Asp Met Leu Thr Val Glu Glu  
 980 985 990

His Ile Trp Phe Tyr Ala Arg Leu Lys Gly Leu Ser Glu Lys His Val  
 995 1000 1005

Lys Ala Glu Met Glu Gln Met Ala Leu Asp Val Gly Leu Pro Ser Ser  
 1010 1015 1020

Lys Leu Lys Ser Lys Thr Ser Gln Leu Ser Gly Gly Met Gln Arg Lys  
 1025 1030 1035 1040

Leu Ser Val Ala Leu Ala Phe Val Gly Gly Ser Lys Val Val Ile Leu  
 1045 1050 1055

Asp Glu Pro Thr Ala Gly Val Asp Pro Tyr Ser Arg Arg Gly Ile Trp  
 1060 1065 1070

Glu Leu Leu Leu Lys Tyr Arg Gln Gly Arg Thr Ile Ile Leu Ser Thr  
 1075 1080 1085

His His Met Asp Glu Ala Asp Val Leu Gly Asp Arg Ile Ala Ile Ile  
 1090 1095 1100

Ser His Gly Lys Leu Cys Cys Val Gly Ser Ser Leu Phe Leu Lys Asn  
 1105 1110 1115 1120

Gln Leu Gly Thr Gly Tyr Tyr Leu Thr Leu Val Lys Lys Asp Val Glu  
 1125 1130 1135

Ser Ser Leu Ser Ser Cys Arg Asn Ser Ser Ser Thr Val Ser Tyr Leu  
 1140 1145 1150

Lys Lys Glu Asp Ser Val Ser Gln Ser Ser Ser Asp Ala Gly Leu Gly

160

1410

1

1420

Pro Asp Thr Pro Cys Gln Ala Gly Glu Glu Glu Trp Thr Thr Ala Pro  
 1425 1430 1435 1440

Val Pro Gln Thr Ile Met Asp Leu Phe Gln Asn Gly Asn Trp Thr Met  
 1445 1450 1455

Gln Asn Pro Ser Pro Ala Cys Gln Cys Ser Ser Asp Lys Ile Lys Lys  
 1460 1465 1470

Met Leu Pro Val Cys Pro Pro Gly Ala Gly Gly Leu Pro Pro Pro Gln  
 1475 1480 1485

Arg Lys Gln Asn Thr Ala Asp Ile Leu Gln Asp Leu Thr Gly Arg Asn  
 1490 1495 1500

Ile Ser Asp Tyr Leu Val Lys Thr Tyr Val Gln Ile Ile Ala Lys Ser  
 1505 1510 1515 1520

Leu Lys Asn Lys Ile Trp Val Asn Glu Phe Arg Tyr Gly Gly Phe Ser  
 1525 1530 1535

Leu Gly Val Ser Asn Thr Gln Ala Leu Pro Pro Ser Gln Glu Val Asn  
 1540 1545 1550

Asp Ala Ile Lys Gln Met Lys Lys His Leu Lys Leu Ala Lys Asp Ser  
 1555 1560 1565

Ser Ala Asp Arg Phe Leu Asn Ser Leu Gly Arg Phe Met Thr Gly Leu  
 1570 1575 1580

Asp Thr Arg Asn Asn Val Lys Val Trp Phe Asn Asn Lys Gly Trp His  
 1585 1590 1595 1600

Ala Ile Ser Ser Phe Leu Asn Val Ile Asn Asn Ala Ile Leu Arg Ala  
 1605 1610 1615

Asn Leu Gln Lys Gly Glu Asn Pro Ser His Tyr Gly Ile Thr Ala Phe  
 1620 1625 1630

Asn His Pro Leu Asn Leu Thr Lys Gln Gln Leu Ser Glu Val Ala Leu  
 1635 1640 1645

Met Thr Thr Ser Val Asp Val Leu Val Ser Ile Cys Val Ile Phe Ala  
 1650 1655 1660

Met Ser Phe Val Pro Ala Ser Phe Val Val Phe Leu Ile Gln Glu Arg



680

1925

1930

1935

Pro Pro Gly Glu Cys Phe Gly Leu Leu Gly Val Asn Gly Ala Gly Lys  
 1940 1945 1950

Ser Ser Thr Phe Lys Met Leu Thr Gly Asp Thr Thr Val Thr Arg Gly  
 1955 1960 1965

Asp Ala Phe Leu Asn Lys Asn Ser Ile Leu Ser Asn Ile His Glu Val  
 1970 1975 1980

His Gln Asn Met Gly Tyr Cys Pro Gln Phe Asp Ala Ile Thr Glu Leu  
 1985 1990 1995 2000

Leu Thr Gly Arg Glu His Val Glu Phe Phe Ala Leu Leu Arg Gly Val  
 2005 2010 2015

Pro Glu Lys Glu Val Gly Lys Val Gly Glu Trp Ala Ile Arg Lys Leu  
 2020 2025 2030

Gly Leu Val Lys Tyr Gly Glu Lys Tyr Ala Gly Asn Tyr Ser Gly Gly  
 2035 2040 2045

Asn Lys Arg Lys Leu Ser Thr Ala Met Ala Leu Ile Gly Gly Pro Pro  
 2050 2055 2060

Val Val Phe Leu Asp Glu Pro Thr Thr Gly Met Asp Pro Lys Ala Arg  
 2065 2070 2075 2080

Arg Phe Leu Trp Asn Cys Ala Leu Ser Val Val Lys Glu Gly Arg Ser  
 2085 2090 2095

Val Val Leu Thr Ser His Ser Met Glu Glu Cys Glu Ala Leu Cys Thr  
 2100 2105 2110

Arg Met Ala Ile Met Val Asn Gly Arg Phe Arg Cys Leu Gly Ser Val  
 2115 2120 2125

Gln His Leu Lys Asn Arg Phe Gly Asp Gly Tyr Thr Ile Val Val Arg  
 2130 2135 2140

Ile Ala Gly Ser Asn Pro Asp Leu Lys Pro Val Gln Asp Phe Phe Gly  
 2145 2150 2155 2160

Leu Ala Phe Pro Gly Ser Val Leu Lys Glu Lys His Arg Asn Met Leu  
 2165 2170 2175

Gln Tyr Gln Leu Pro Ser Ser Leu Ser Ser Leu Ala Arg Ile Phe Ser

2190

<223> Description of Artificial Sequence: ABC1  
amplification primer

<400> 12

gctttctttc acttctcatc ctg

23

<210> 13

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1 RT-PCR  
primer

<400> 13

tccttggggtt caggggatta tc

22

<210> 14

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1 RT-PCR  
primer

<400> 14

caatgttttt gtggcttcgg c

21

<210> 15

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1 RT-PCR  
primer

<400> 15

agtcgagctc caaacatgtc agctgttact ggaagtggcc

40

<210> 16  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1 RT-PCR  
primer

<400> 16  
tctctggatt ctgggtctat gtcag

25

<210> 17  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1 RT-PCR  
primer

<400> 17  
gggagccttt gtggaactct ttc

23

<210> 18  
<211> 41  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1 RT-PCR  
primer

<400> 18  
actggtcgac cattgaattg cattgcattg aatagtatca g

41

<210> 19  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 19

tttcctgggtg gacaatgaa

19

<210> 20

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 20

agtgacatgc gacaggag

18

<210> 21

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 21

gatctggaag gcatgtgg

18

<210> 22

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 22



<220>

<400> 23  
ggcctggaca acagcata

18

**<220>**

```
<400> 24
ggacaacctg tttgagagt
```

19

<220>

```
<400> 25
aagacgacca ccatgtca
```

18

47

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 26

atatgggagc tgctgctg

18

<210> 27

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 27

gggcatgagc tgacctatgt gctg

24

<210> 28

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 28

aagagactgc taattgcc

18

<210> 29

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer





<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 33

gatgccatca cagagctg

18

<210> 34

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 34

agtgtccagc atctaaa

17

<210> 35

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 35

caaagttcac aaatactt

18

<210> 36

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 36  
cttagggcac aattccaca

19

<210> 37  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>

<220>  
<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 37  
tgaaagttga tgattttc

18

<210> 38  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>

<220>  
<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 38  
tttttcacca tgtcgatga

19

<210> 39  
<211> 17  
<212> DNA  
<213> Artificial Sequence

<220>

<220>  
<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 39  
ctccactgat gaactgc

17

<210> 40  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 40  
gtttcttcat ttgtttga

18

<210> 41  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 41  
agggcgtgct tgggattg

18

<210> 42  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 42  
cagaatcatt tggatcag

18

<210> 43  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 43

catcagaact gctctgag

18

<210> 44

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 44

agctggcttg ttttgcttt

19

<210> 45

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 45

tggacacgcc cagcttca

18

<210> 46

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 46

cctgccatgc cacacaca

18

<210> 47

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 47

ctcatcaccc gcagaaag

18

<210> 48

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 48

cacactccat gaagcgag

18

<210> 49

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 49

tccagataat gcgggaaa

18

<210> 50

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 50

tcaggattgg cttcagga

18

<210> 51

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1  
sequencing primer

<400> 51

aagtttgagc tggatttctt g

21

<210> 52

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: beta-globin  
antisense oligonucleotide

<400> 52

cctcttacct cagttacaat ttata

25

<210> 53

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: ABC1 antisense  
oligonucleotide

<400> 53  
catgttggttc ataggggtggg tagctc

26

<210> 54  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: beta-actin  
amplification primer

<400> 54  
tcacccacac tgtgccatct acga

24

<210> 55  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: beta-actin  
amplification primer

<400> 55  
cagcgggaacc gctcattgcc aatgg

25

<210> 56  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>

<220>

<223> Description of Artificial Sequence: sterol  
response element oligonucleotide

<400> 56  
tcgagtgacc gatagtaacc tctcga

26

<210> 57  
<211> 26



<213> Artificial Sequence

 $\langle 220 \rangle$ 

<223> Description of Artificial Sequence: mutated sterol response element oligonucleotide

tcgagctgca catagtaacc tctcga

26

57

[illegible]